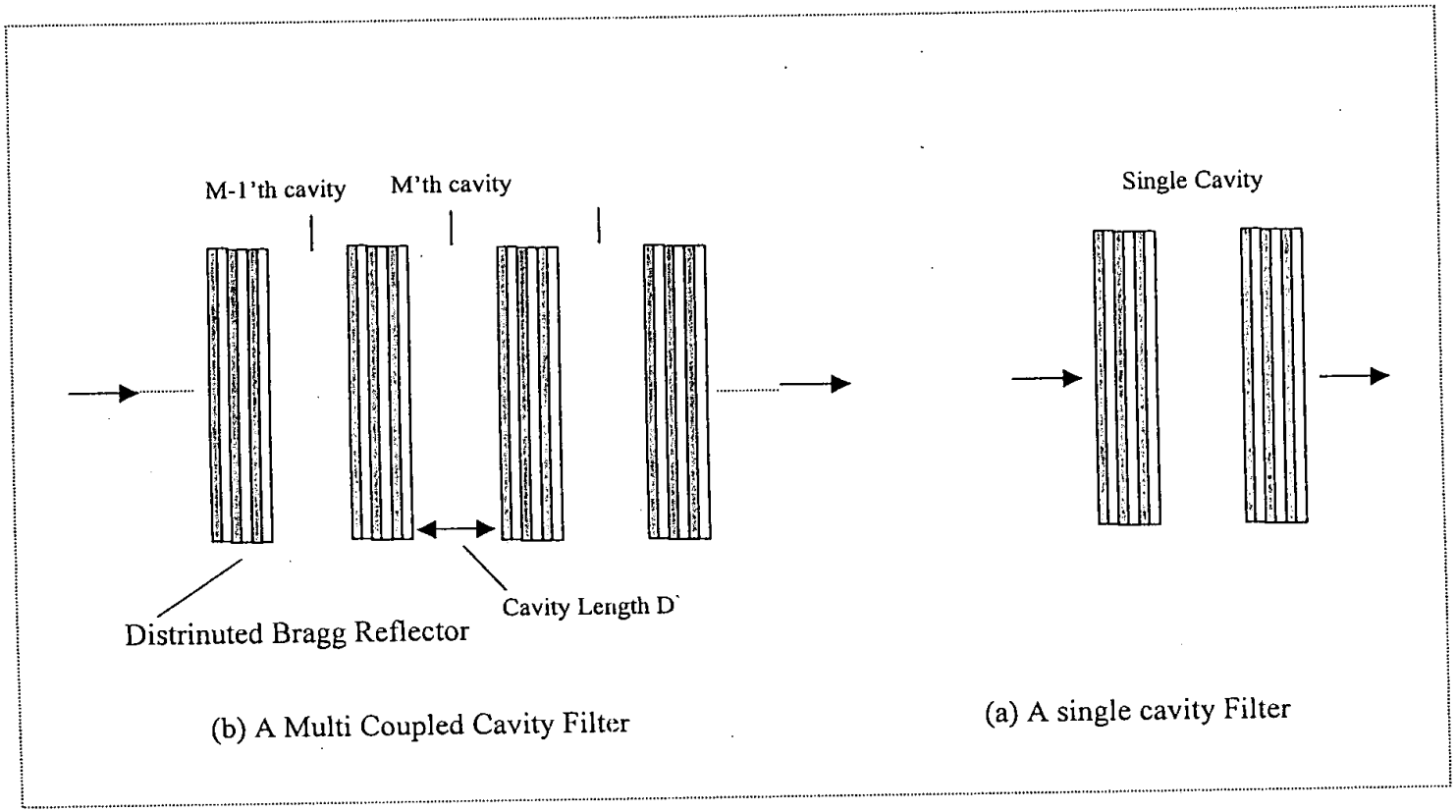

M-1'th cavity
M'th cavity
Single Cavity
Distrinuted Bragg Reflector
Cavity Length D
(b) A Multi Coupled Cavity Filter
(a) A single cavity Filter

Figure 1

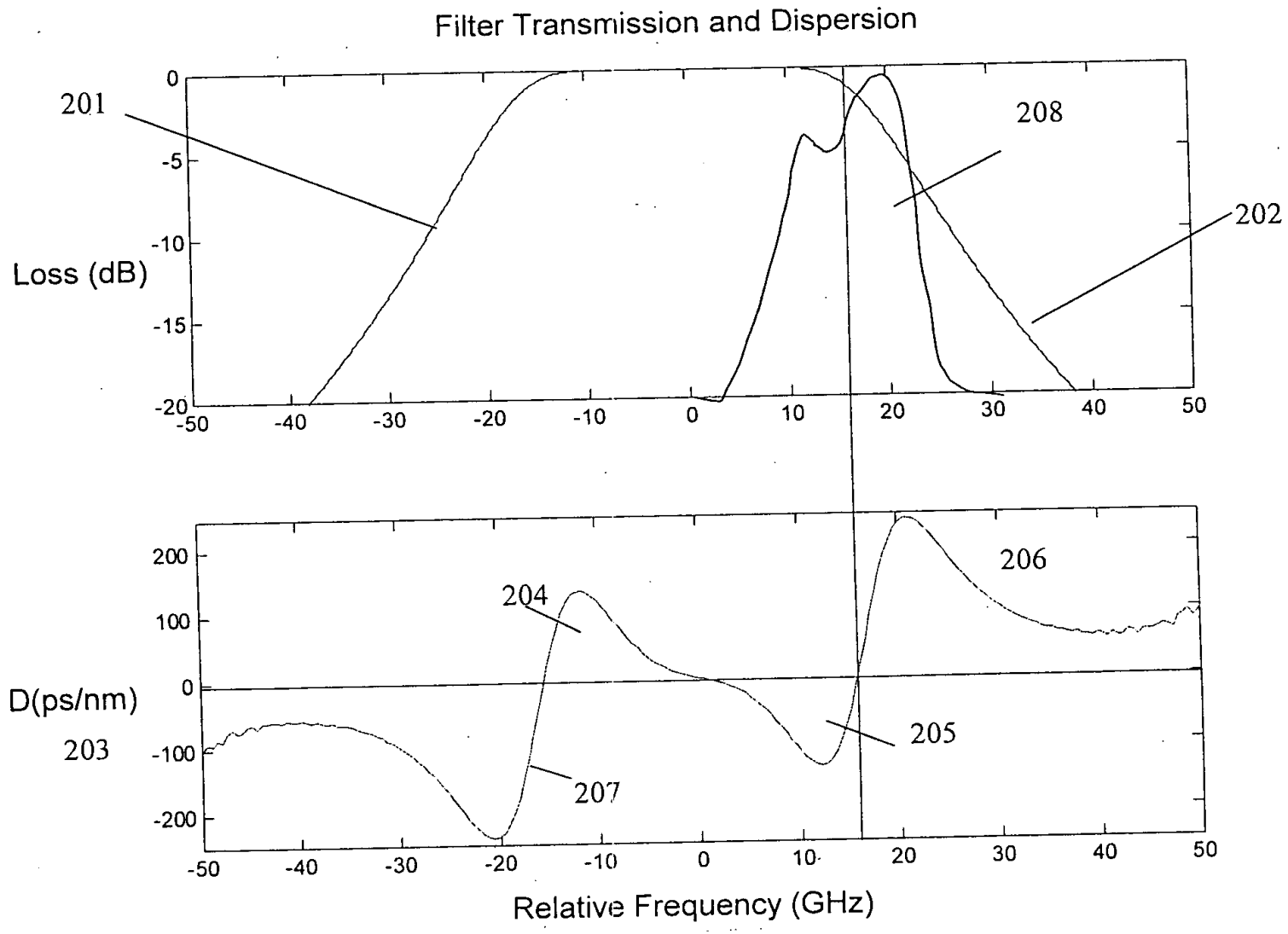
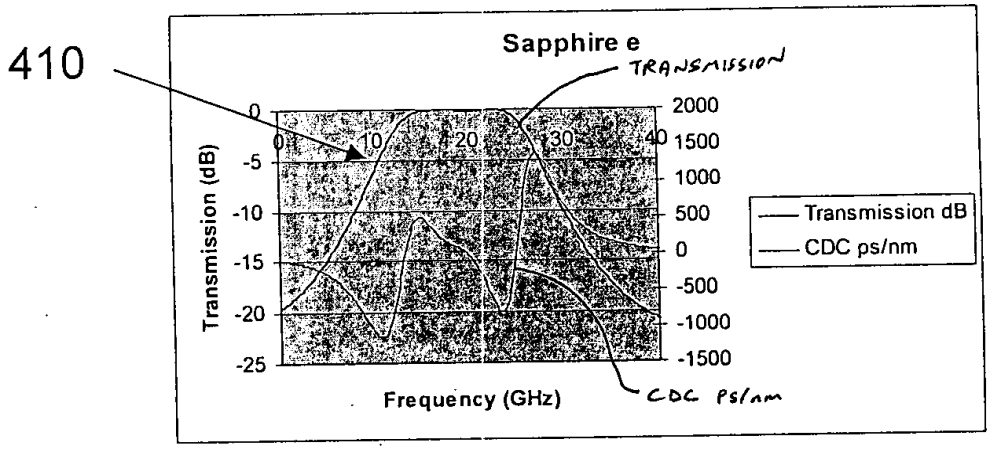
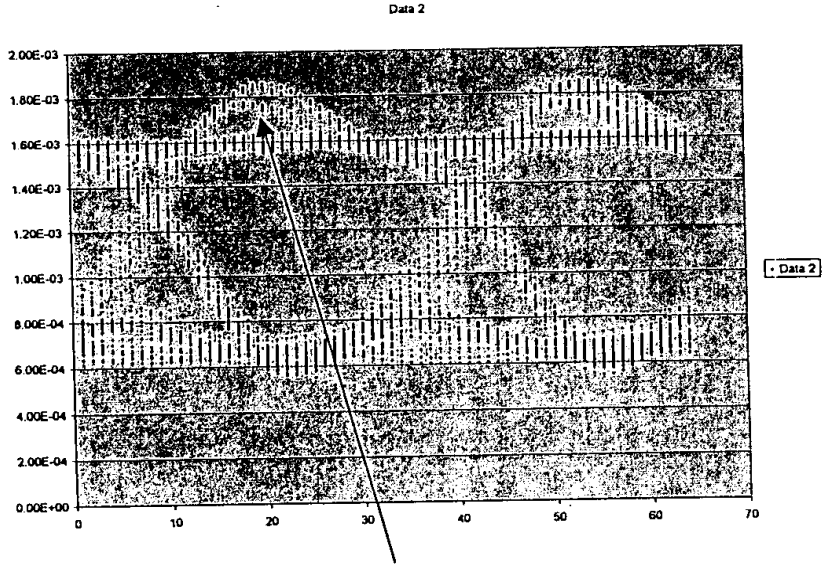

Filter Transmission and Dispersion
201
208
202
Loss (dB)
0
-5
-10
-15
-20
-50
-40
-30
-20
-10
0
10
20
30
40
50
200
100
0
-100
-200
D(ps/nm)
203
204
206
205
207
Relative Frequency (GHz)

Figure 2

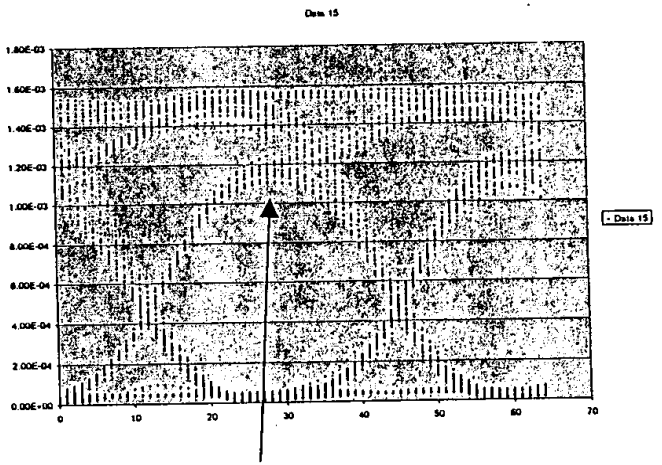


(a)



Overshoot (at top of filter)

(b)



Undershoot (down side of filter)

(c)

Figure 3

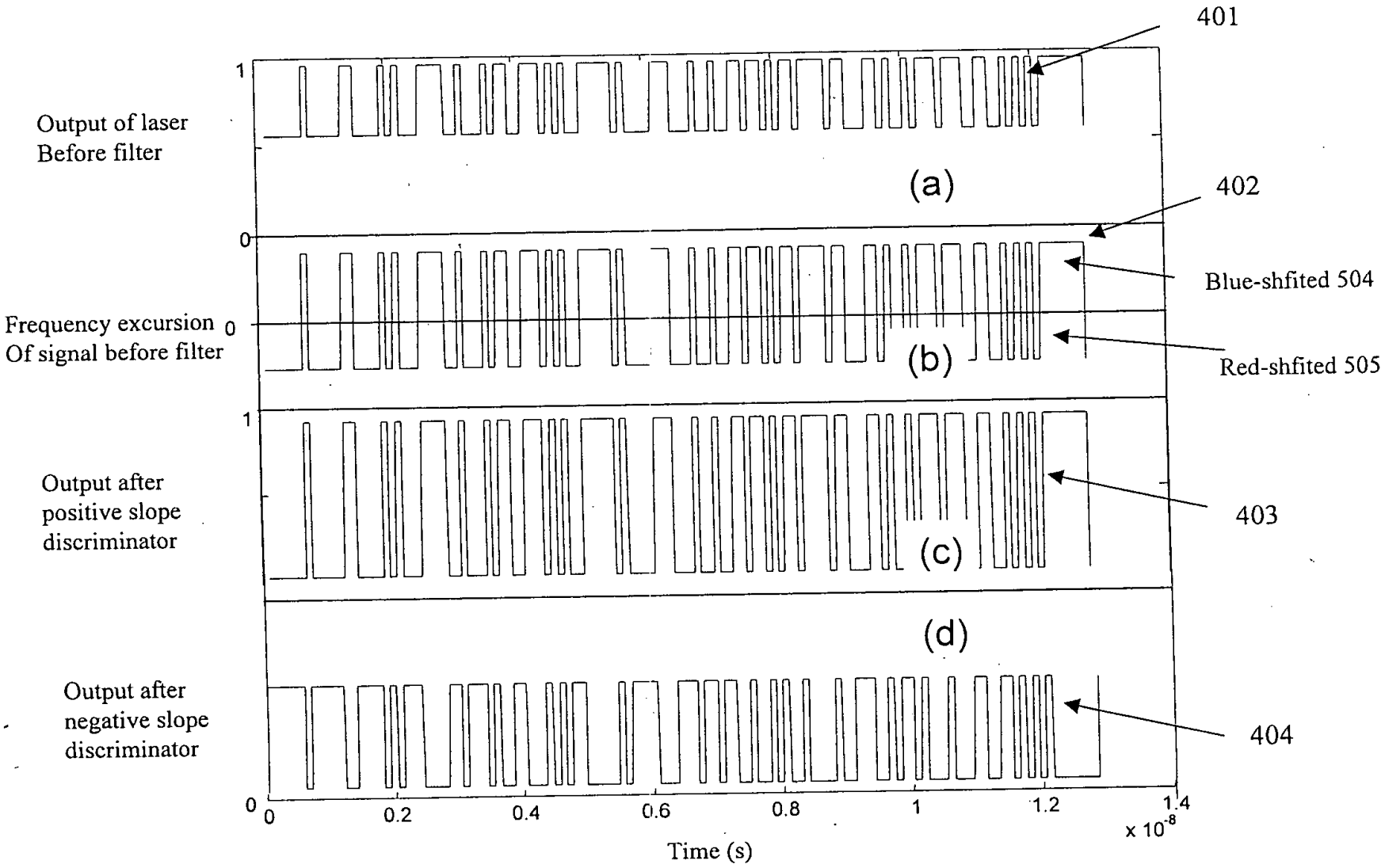
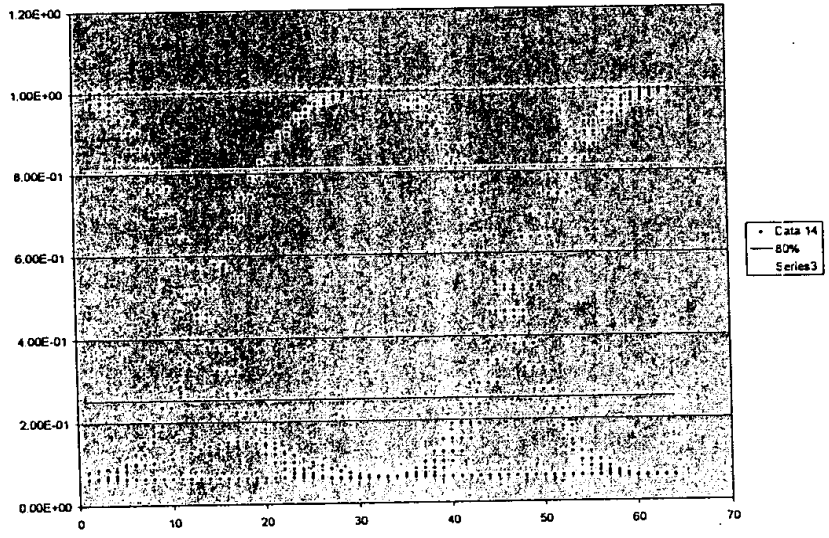

401
Output of laser
Before filter
1
(a)
402
0
Blue-shfited 504
Frequency excursion
Of signal before filter
0
(b)
Red-shfited 505
1
Output after
positive slope
discriminator
403
(c)
(d)
Output after
negative slope
discriminator
404
0
0
0.2
0.4
0.6
0.8
1
1.2
1.4
x 10^-8
Time (s)

Figure 4

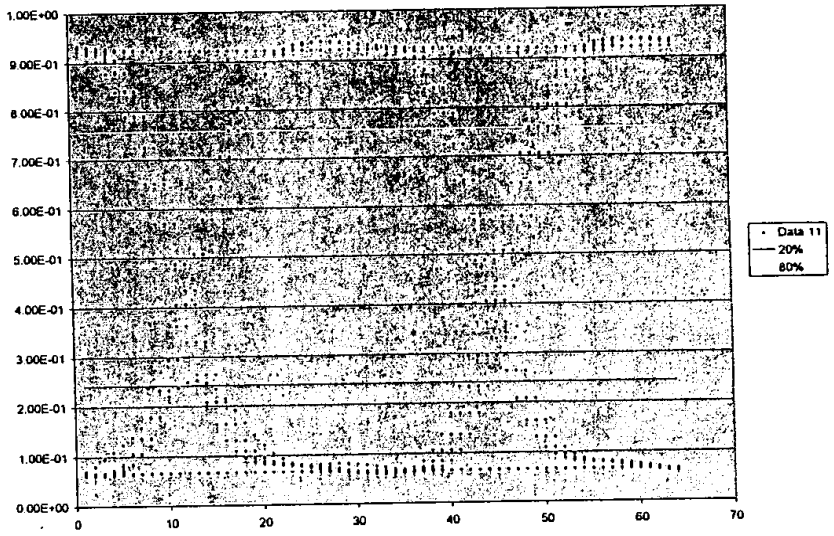
Input signal: Step waveform

12GHz bandwidth filter



Rise time: 33ps

18GHz bandwidth filter



Rise time: 23ps

Figure 5

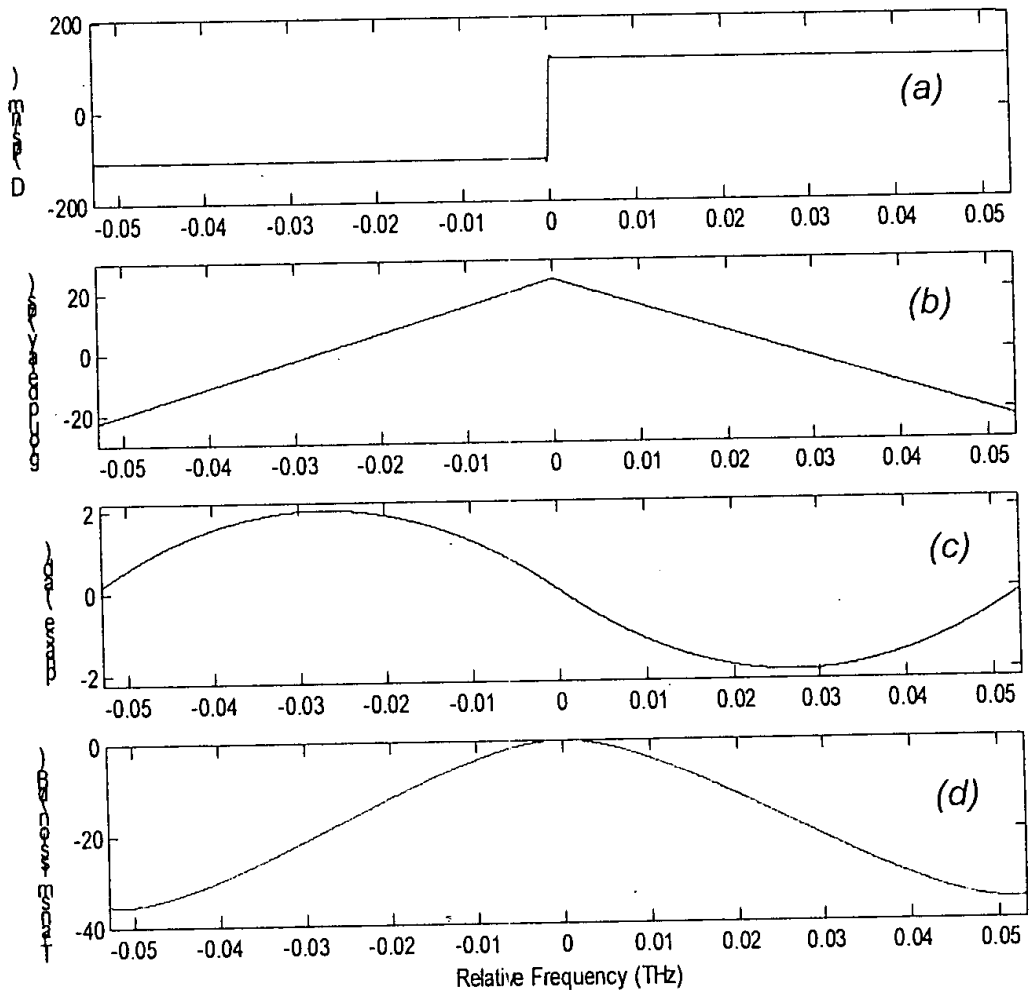

200
0
-200
(a)
-0.05 -0.04 -0.03 -0.02 -0.01 0 0.01 0.02 0.03 0.04 0.05
20
0
-20
(b)
-0.05 -0.04 -0.03 -0.02 -0.01 0 0.01 0.02 0.03 0.04 0.05
2
0
-2
(c)
-0.05 -0.04 -0.03 -0.02 -0.01 0 0.01 0.02 0.03 0.04 0.05
0
-20
-40
(d)
-0.05 -0.04 -0.03 -0.02 -0.01 0 0.01 0.02 0.03 0.04 0.05
Relative Frequency (THz)

Fig. 6

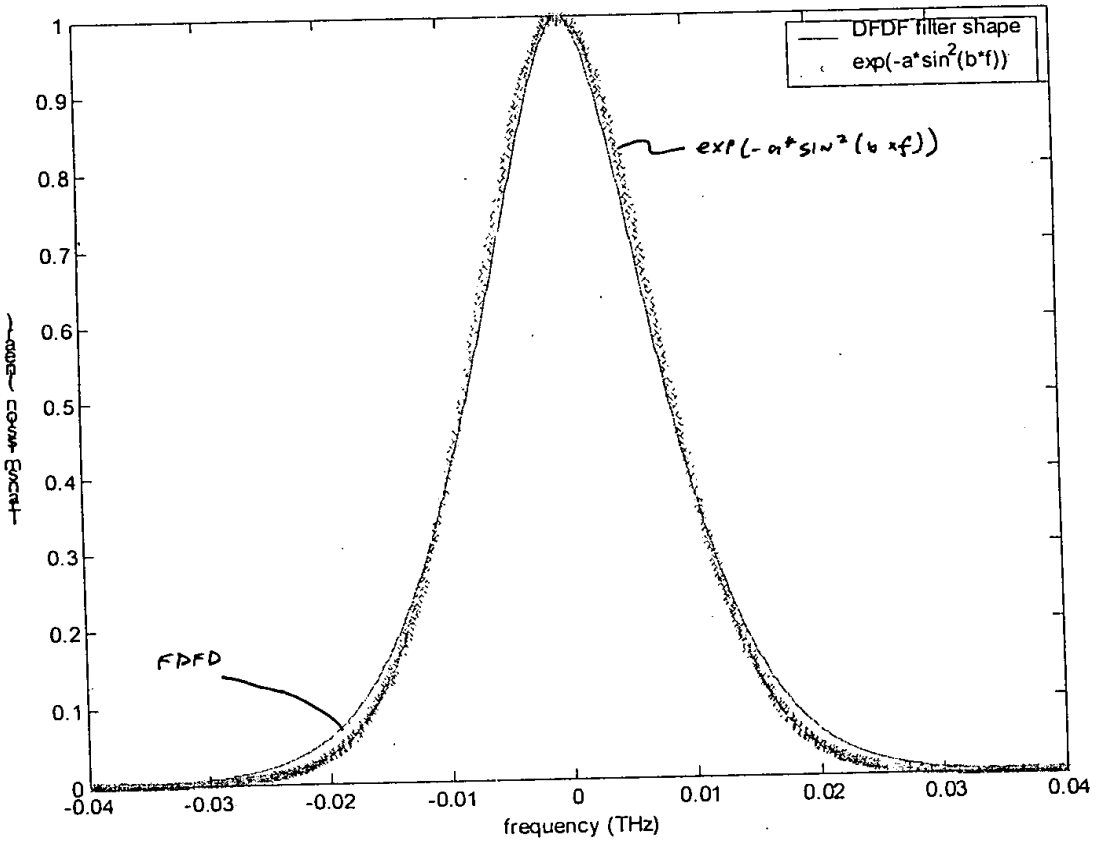

DFDF filter shape
exp(-a*sin^2(b*f))
exp(-a*sin^2(b*f))
FDFD
1
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0
-0.04
-0.03
-0.02
-0.01
0
0.01
0.02
0.03
0.04
frequency (THz)

Figure 7

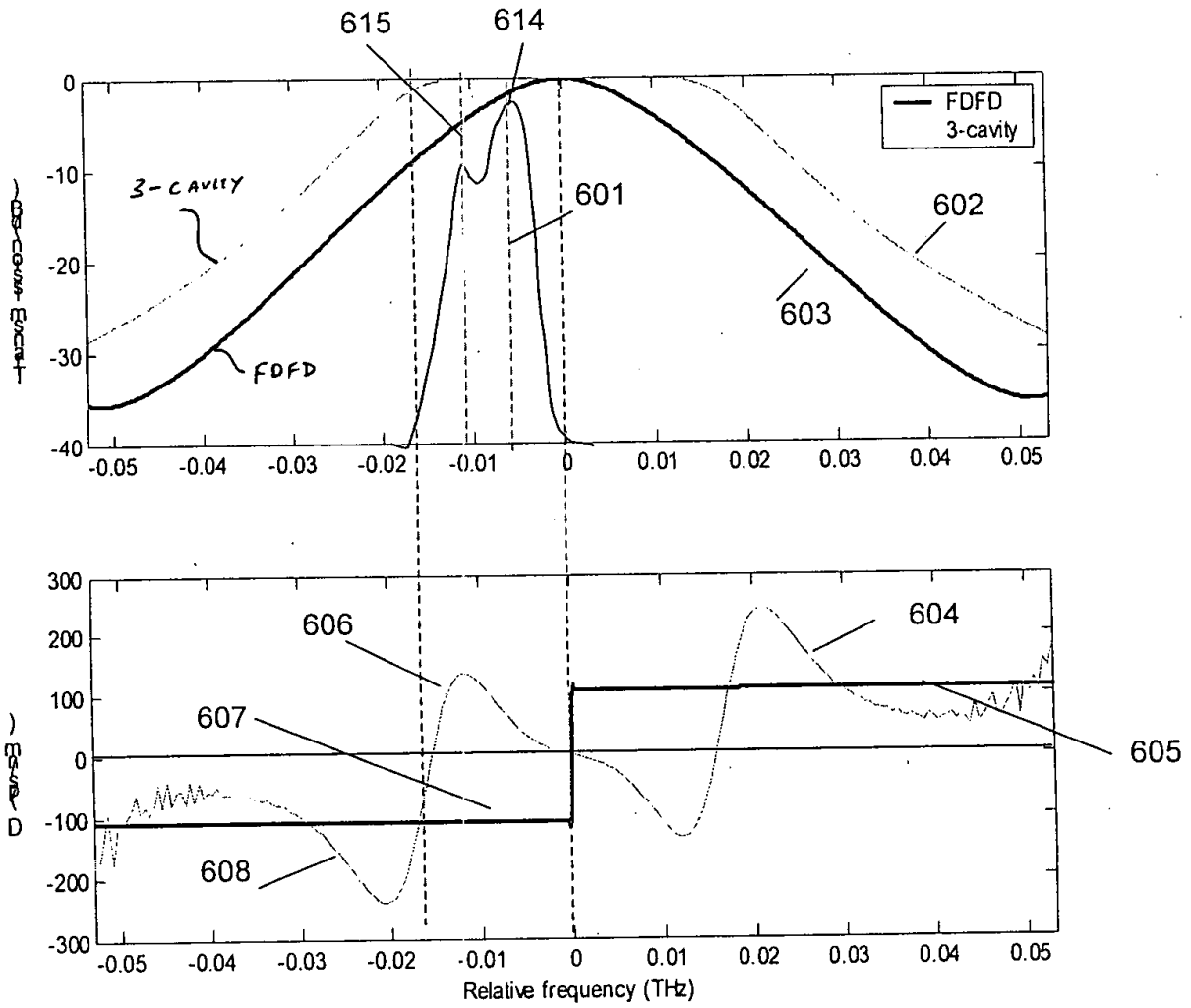

615
614
FDFD
3-cavity
601
602
603
604
605
606
607
608
3-CAVITY
FDFD
0
-10
-20
-30
-40
300
200
100
-100
-200
-300
-0.05
-0.04
-0.03
-0.02
-0.01
0
0.01
0.02
0.03
0.04
0.05
Relative frequency (THz)

Figure 8

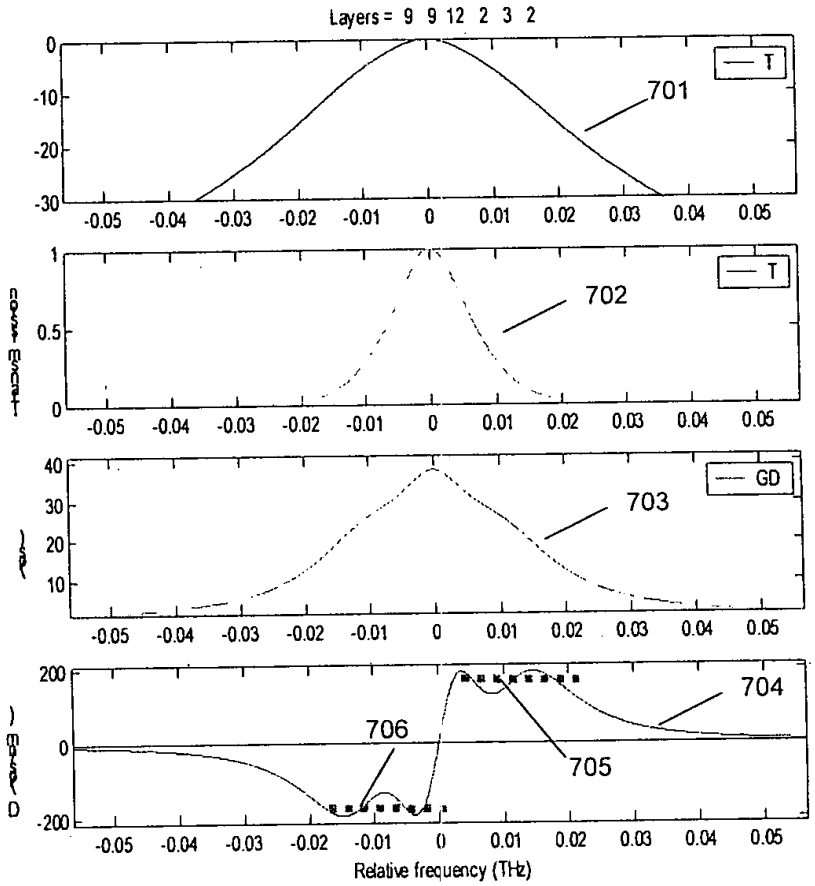

Layers = 9 9 12 2 3 2
T
701
T
702
GD
703
704
706
705
Relative frequency (THz)

Figure 9

Filter definitions

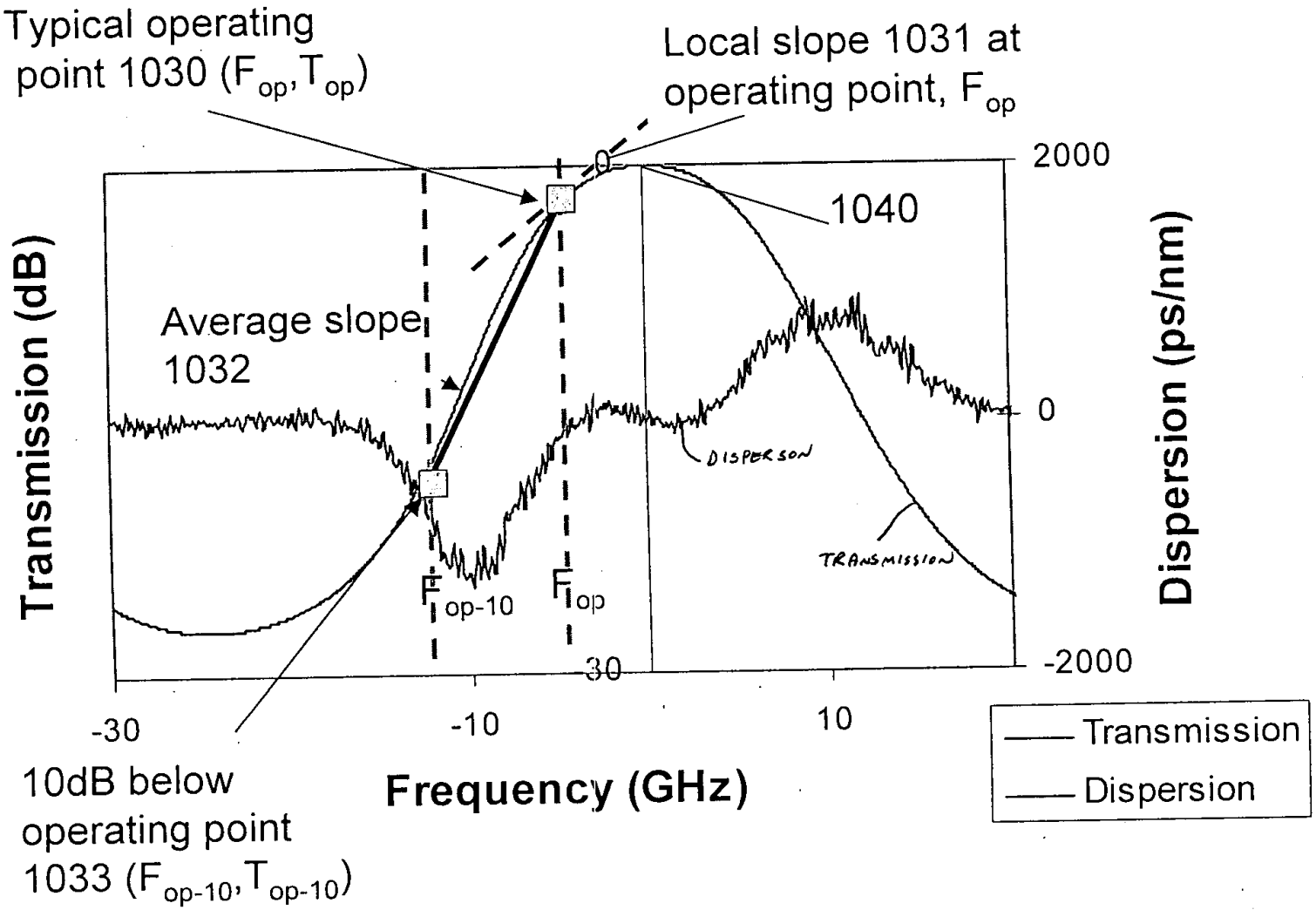


Figure 10

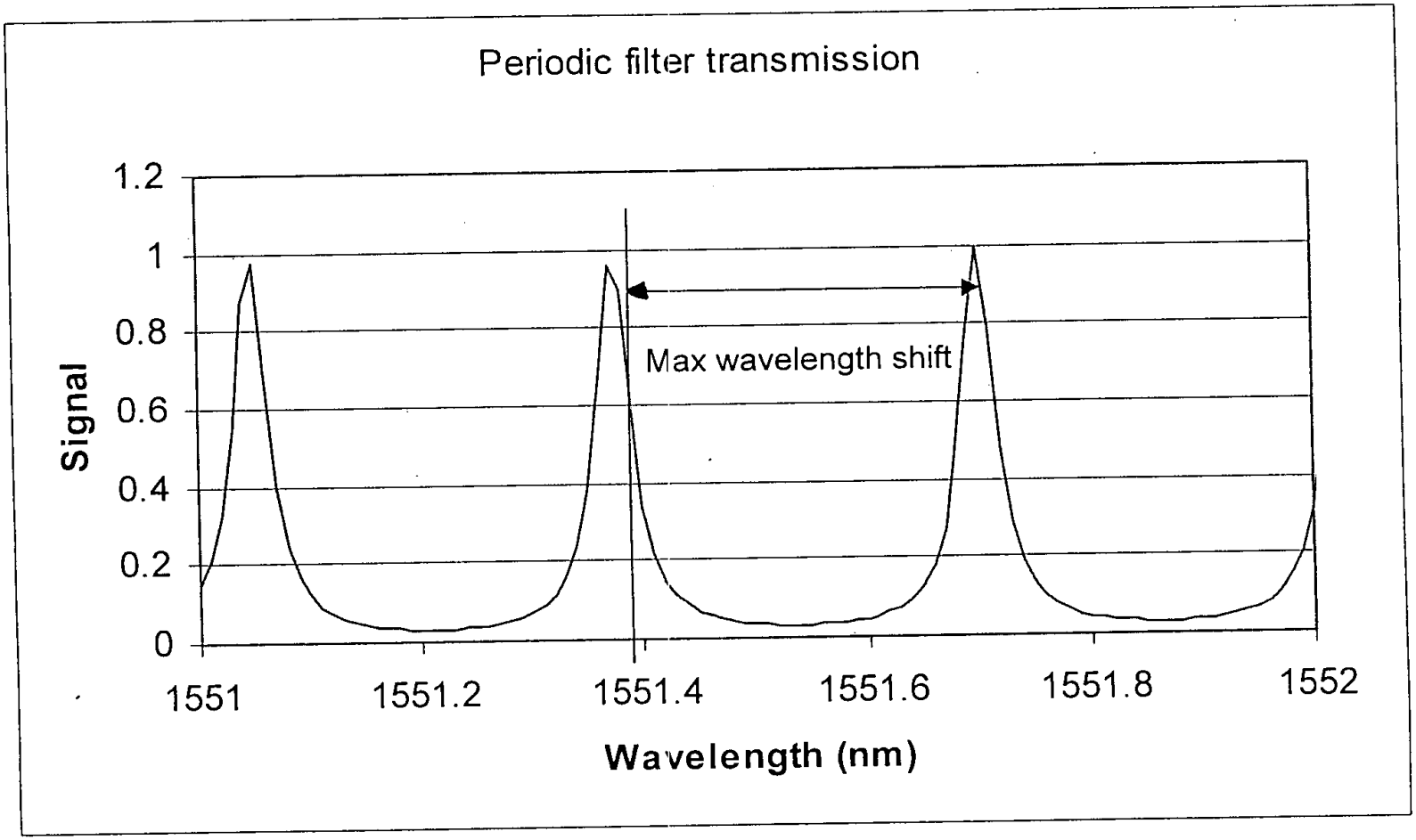

Periodic filter transmission
1.2
1
0.8
0.6
0.4
0.2
0
Signal
Max wavelength shift
1551
1551.2
1551.4
1551.6
1551.8
1552
Wavelength (nm)

Figure 11

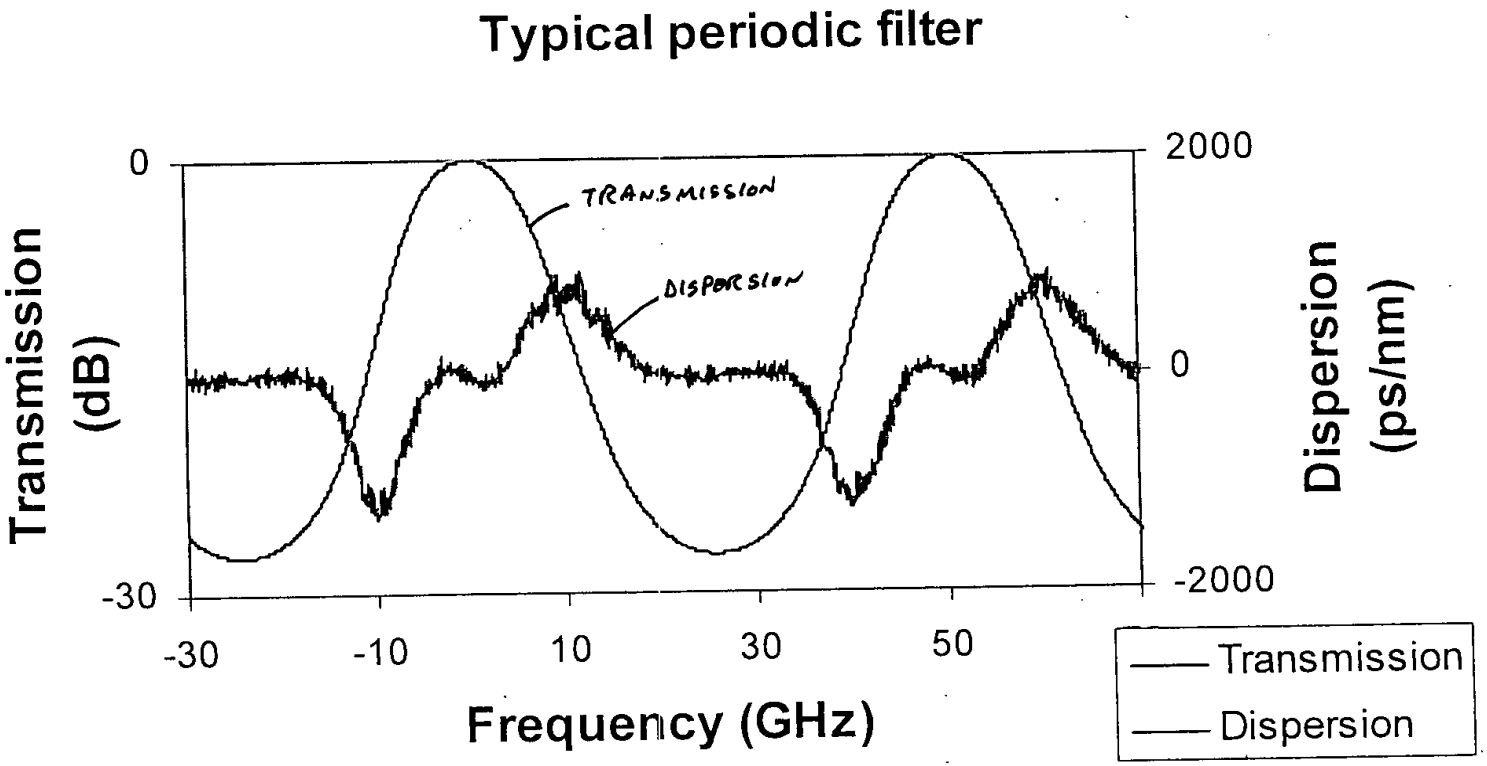

Typical periodic filter
Transmission (dB)
0
-30
2000
0
-2000
TRANSMISSION
DISPERSION
-30
-10
10
30
50
Frequency (GHz)
Dispersion (ps/nm)
Transmission
Dispersion

Figure 12

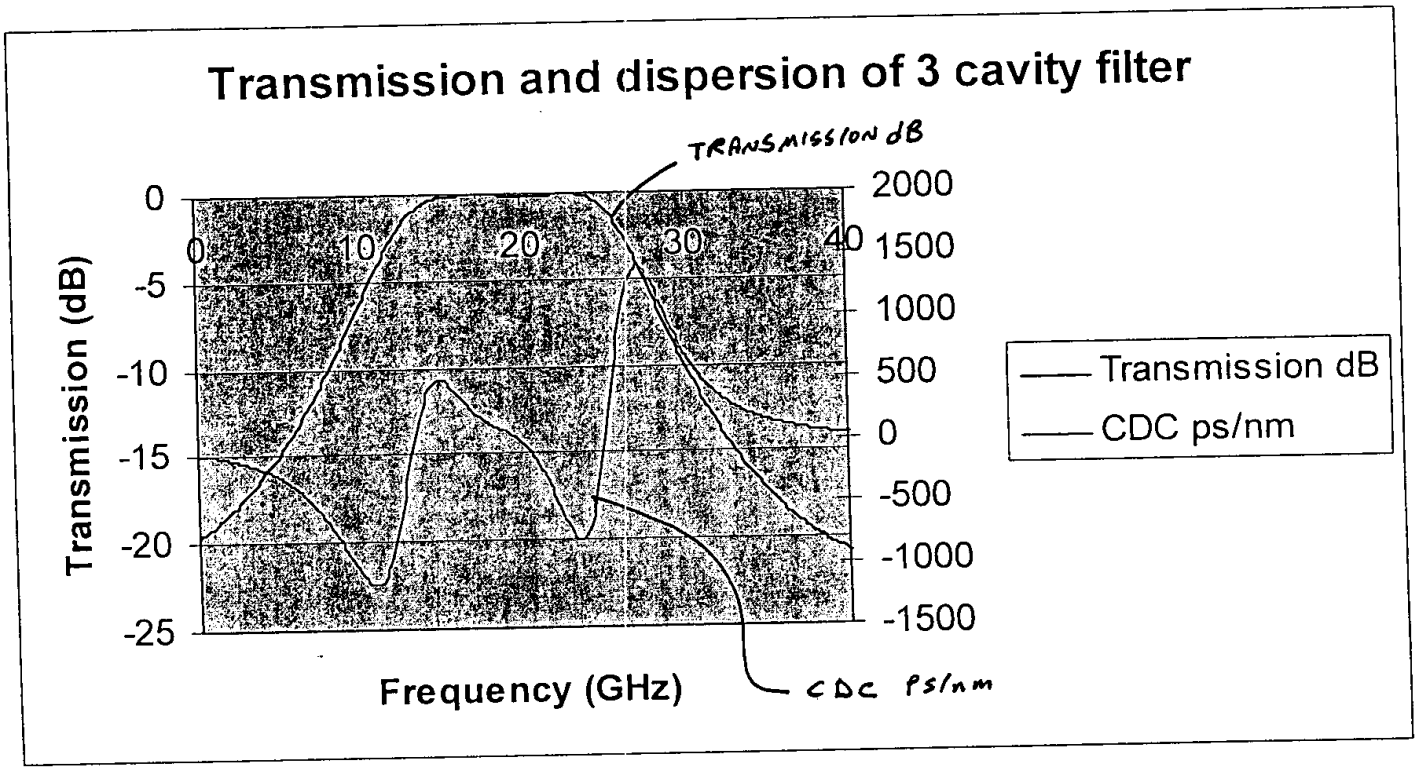

Transmission and dispersion of 3 cavity filter
TRANSMISSION dB
CDC ps/nm
Transmission (dB)
Frequency (GHz)
0
-5
-10
-15
-20
-25
0
10
20
30
40
2000
1500
1000
500
0
-500
-1000
-1500
Transmission dB
CDC ps/nm

Figure 13

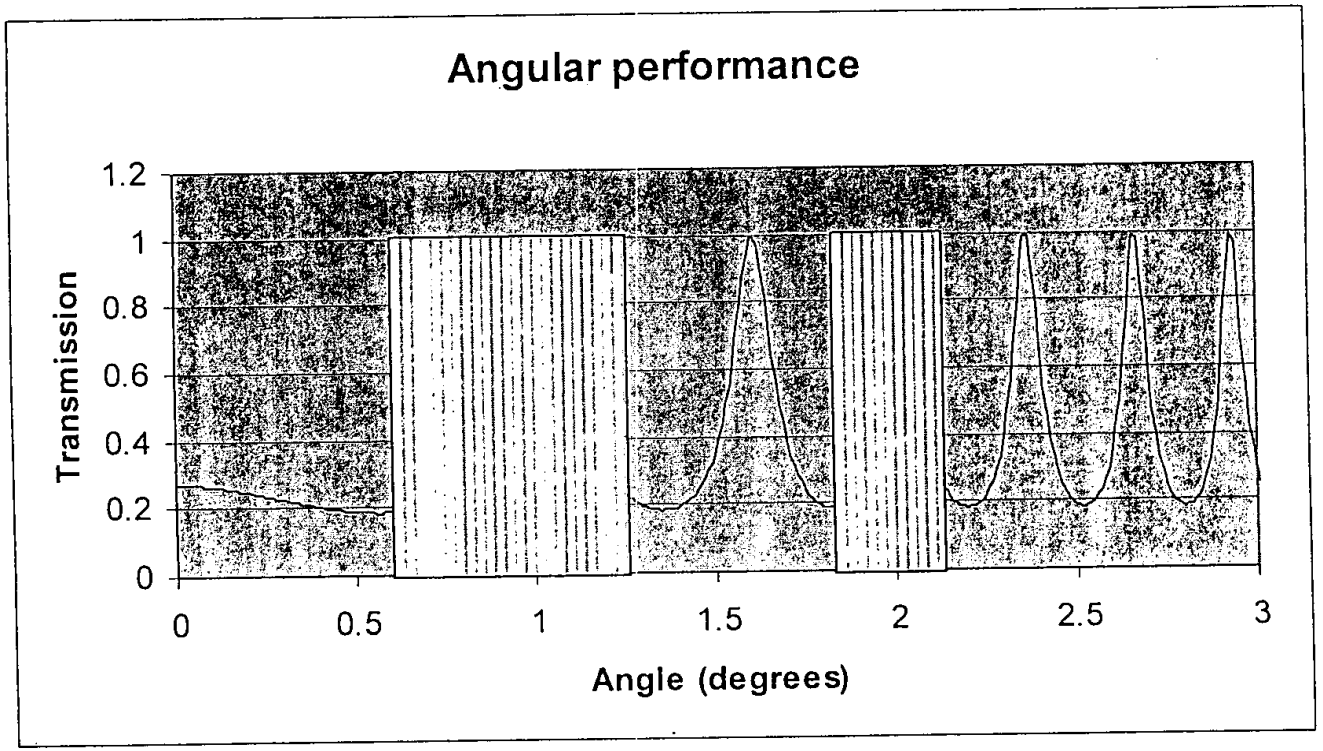
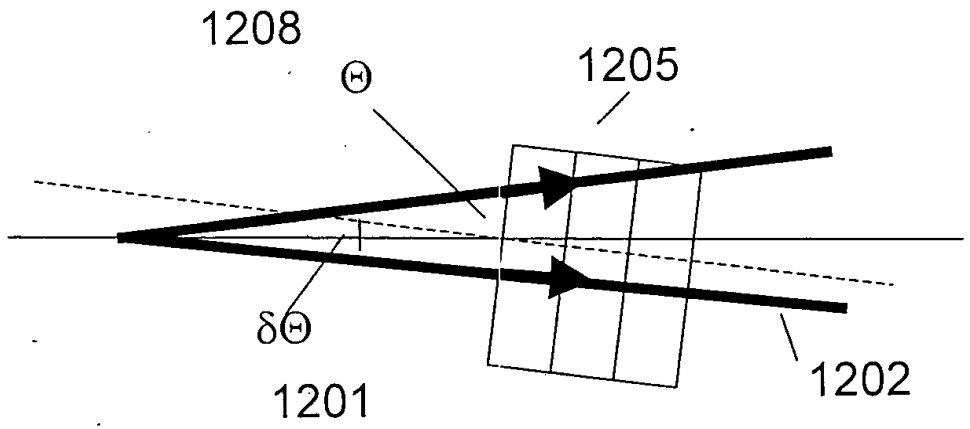
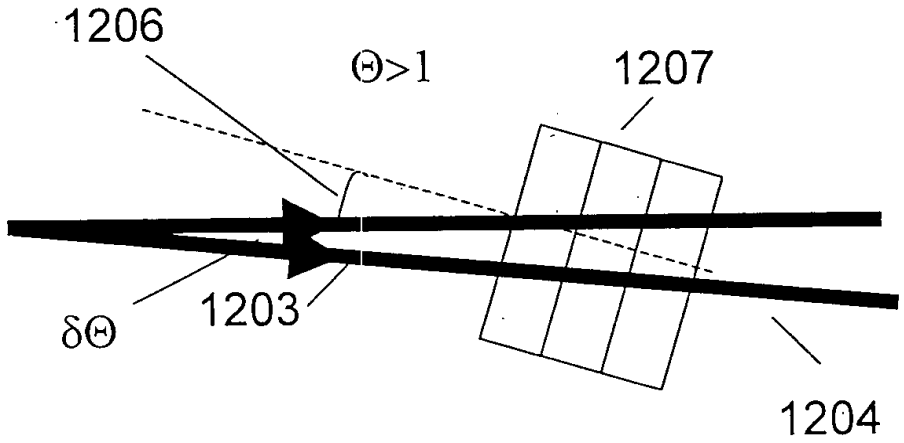

Angular performance
Transmission
1.2
1
0.8
0.6
0.4
0.2
0
0
0.5
1
1.5
2
2.5
3
Angle (degrees)

Figure 14

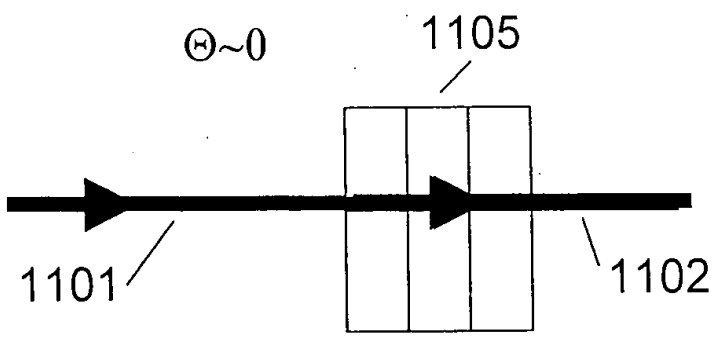


(a)

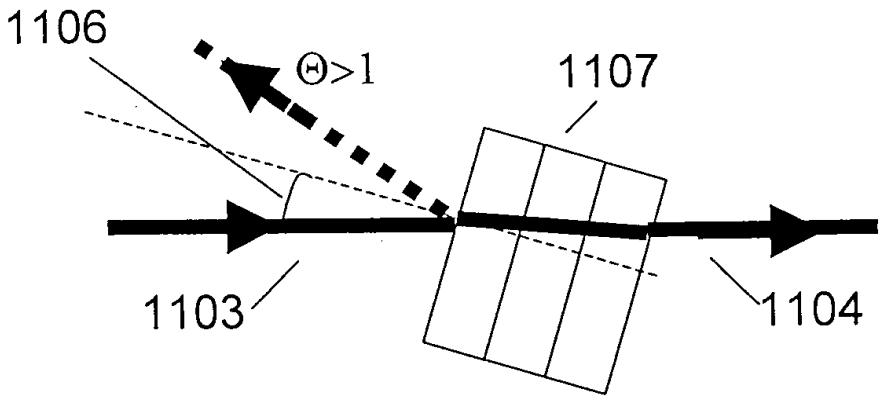


(b)

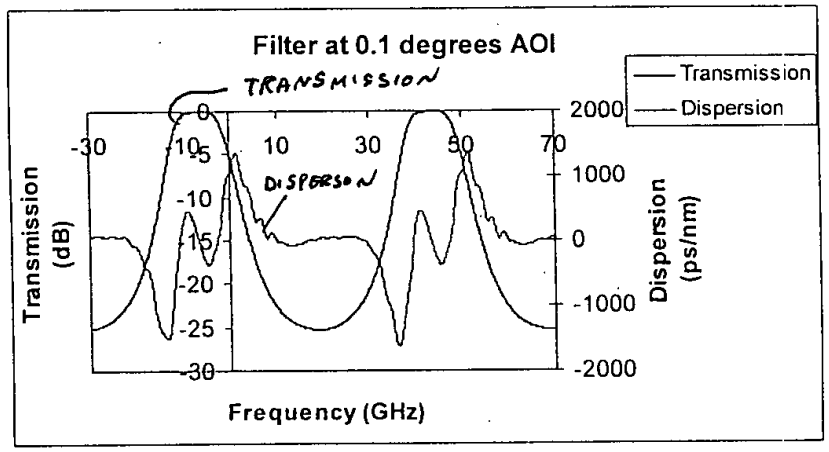
Figure 15



3 cavity etalon
normal incidence



3 cavity etalon
Non-normal incidence



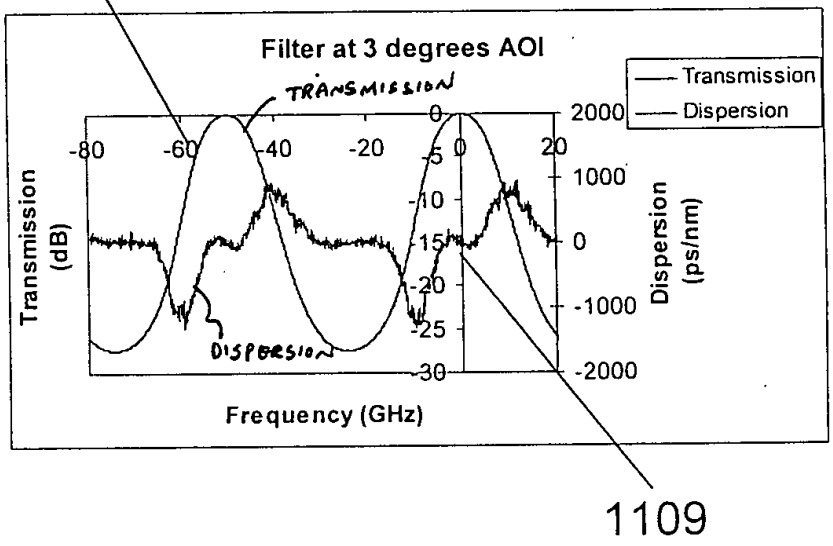


Figure 16